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How to promote healthy eating habits in Children

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Abstract

Childhood's overweight and obesity are a worrying issue in the world nowadays. The purpose of this study was to provide contributions to the promotion of healthy food by analyzing the impact of physical activity, parents' influence and home meals frequency on children's food choices.

Structured questionnaires were used and were answered by 172 children between 10 and 14 years old and by their respective parents.

Children and parents preferred healthy food vs. non-healthy food presenting the children's healthy food choices a mean of 4.26 and the parent's healthy food choices a mean of 4.47 in a scale ranging from 0 to 6. Our results also show that physical activity, parent's education and home meals frequency did not have an impact on children's food choices, contrasting to the sedentary behavior and parents' choices which had a negative and positive correlation, respectively, with children's food choices.

Taking these results into account and using them to advise parents and companies, we underline that parents must guarantee an adequate children's nutrition after doing physical efforts and control the time children watch TV and play computer games and companies may create marketing campaigns and educational programs in order to promote healthy food, improve children's eating habits and reduce the childhood obesity prevalence.

Keywords: Children, physical activity, eat at home, parents, obesity

1. Introduction

A good nutrition is very important in the life's first ages as it influences the child physically and psychologically (Rees and Shaw, 2007). People are eating more non-healthy food and less healthy food (Quintas, 2009) and children's food decisions have been into energetic and high caloric items (Dias and Agante, 2011). The most tragic consequence of the intake of non-healthy food is the problem of overweight and later obesity (Mancino *et al*., 2010).

There are many physical and social drivers that determine children´s food choices (Patrick and Nicklas, 2005). Factors like food availability at home, eat away from home (Story *et al*., 2008), the interaction with peers (Brown *et al*., 2000), school (Mancino *et al.*, 2010), advertising, the active or non-active life style (Croll *et al*., 2001) and parents' influence (Kraak and Pelletrier, 1998) can be considered. This study aimed at analyzing factors involved in children's food choices and the impact of three specific aspects: **children's physical activity**, **frequency of home meals** and **parents' influence** as drivers for food choices. Analyzing the literature, we understood that these factors are the most commonly referred to explain food choices in international studies (Thompson *et al.*, 2003; Kraak and Pelletrier, 1998 and Guthrie *et al.*, 2002). Furthermore, the choice for physical activity resulted from the recognized importance of a good nutrition combined with a healthy life style. Considering the fact that the main cause of obesity has been the consumption of junk food (Mancino *et al*., 2010) and this is provided mostly in restaurants and places away from home, the home meals construct is an important point of focus. Moreover, the choice for the parents arose from the fact that they are the most direct influence and example to their children and are presented in almost every moment of their life (Brown, 2008).

Another motivation to study this topic was that more and more food companies are concerned with these issues and have been introducing the functional foods on their portfolio. These functional foods consist in adding the detailed nutrients to the products' labels, with the objective of improving the person's well-being and health (Menrad, 2003).

There is an extensive body of research on children's eating habits and the factors associated with their poor eating behavior. Many studies analyzed food choices through what children usually eat or what they ate in a recent past but few studies are conclusive regarding the children's food choices when they are presented with several options. Moreover, of all the associated factors, previous research identified the three already referred aspects, but no study did analyze them together. As children are a market opportunity and represent the future generation, it is important to get insights about the factors influencing their current food choices. The purpose of this study was to understand what the Portuguese children's preferences are, in terms of healthy versus non-healthy food and to assess the impact that the parents' food choices and educational level, physical activity and home meals frequency have on those choices.

2. Literature Review and Hypotheses Formulation

Healthy food

Healthy food can be seen as any nourishment beneficial to health. Examples of healthy food items are fruit, vegetables, grains, dairy and low fat meat (Birch and Fisher, 1998; Story *et al*., 2008). Contrasting to this, non-healthy food is seen as having high values of sugar, fat, cholesterol and is carrier of chemical additives[1].

[1] http://www.indiadiets.com/foods/unhealthy_foods/unhealthy_foods.htm

Present situation regarding children's eating patterns

Childhood obesity is one of the most disturbing issues of the world. In Europe, the numbers are getting out of control. Paulino (2007) refers in her study that 20% of the European children are overweighed and around 7% of these are already obese. When obesity starts in teenagers, the problem gets worse as it is of great probability that it will remain in the adult ages (Resnicow *et al*., 1998).

In Portugal the situation is as alarming and more than 30% of Portuguese children between 7 and 11 years old are obese or at least overweighed (Moreira, 2007). The prevalence of childhood obesity in Portugal is amongst the higher ones in Europe[2]. The Portuguese eating habits are far away from what is considered an adequate diet. Actually children are increasingly opting for fast food, snacks (Kraak and Pelletrier, 1998) and soft drinks (Wang *et al*., 2008). The consumption of high saturated fats and red meat is also increasing[3]. On the other hand they are reducing what is considered healthy eating, presenting small levels of fruit and vegetables intake (Birch and Fisher, 1998). Furthermore obesity may cause serious health problems like cardiovascular diseases, diabetes (Invitti *et al*., 2006) or cancer (World Health Organization, 2003).

Brands' positions regarding healthy food

Being obesity one of the most worrying complications the world is facing, it is important that food brands assume some position in order to fight this issue. It is crucial to hurry the change of consumers' eating attitudes (Chrysochou, 2010). Some brands in the food industry are taking actions and looking for ways to promote better food choices (Mancino *et al*, 2010). Some private brands are providing educational programs informing the population on nutrition and good eating habits (Assema *et al*., 2001).

[2] http://www.publico.pt/Sociedade/taxa-de-obesidade-infantil-em-portugal-e-das-mais-altas-da-europa-1233657

[3] Diário de Aveiro 15-12-2010 *Dieta dos portuguesa afasta-se das boas práticas nutricionais*

Chrysochou (2010) refers in his study that another way brands have followed is to start changing the nutrients of their products transforming them into functional foods, which are products injected with some nutrients considered to be healthier, such as fiber, calcium, Antioxidants, Omega-3 and Vitamin D (Menrad, 2003), reducing the ones less beneficial to health, like sugar. JP Morgan Insight Investment[4] ranked ten brands that are acting against obesity. Danone is the brand with the healthiest offers, followed by Unilever, and Nestlé being the third.

Eating habits can be seen as an identity (Paulino, 2007) that may result in negative effects when people are overweighed or obese or that can even result in depression (Dobrow *et al.*, 2002). Promoting healthy eating habits is urgent in order to stop the increase of childhood obesity in the world.

Physical activity: Physical activity is defined as the body movements that result in high amounts of energy consumption (Thompson *et al.*, 2003). Currently, more and more children have a sedentary life style that is associated with low levels of energy expenditure (Pearson and Biddle, 2011) that is an important cause for weight gain (Moreira, 2007) and the witnessed increase in this kind of life may have as a consequence childhood obesity (Carola, 2008). Two main causes for a sedentary life style are playing computer games and watching TV (Rey-Lopéz *et al*., 2007). Children between ten and sixteen years old watch on average four and a half hours TV during the weekdays and seven and a half hours on weekends[4]. Padez *et al*. (2005), studying Portuguese children between seven and nine years old, found a direct association between the number of hours watching TV and overweight/obesity. Coon and Tucker (2002) found that the more time spent watching TV, the more likely it is to ingest

[4] http://www.dn.pt/inicio/interior.aspx?content_id=633525

energetic foods and soda. Moreover, Larson *et al.* (2009) found an inverse association between watching TV and dairy products' intake and, in another study, the same author (Larson *et al.*, 2008) presents an inverse association between watching TV and fruit and vegetables consumption. The sedentary life style in children and adolescents is related to having less healthy eating patterns (Pearson and Biddle, 2011). Being sedentary life associated with playing computer games and watching TV, and these factors associated with the intake of unhealthy food, it is expected that the more active children are, the more they will choose healthier food. Furthermore, it is also expected that children that spend most of their time watching TV or playing electronic games, will choose less healthy food.

H_1: Children with high levels of physical activity tend to choose more healthy food

H_2: The more time children watch TV and play computer games, the less they will choose healthy food.

Parents' influence: Parents are seen as the most powerful influence on children eating behaviors (Kraak and Pelletrier, 1998). Brown (2008) refers in her study that family is the "center of people's lives" and parental attitudes and behaviors are of great impact in what concerns to children's eating habits (Patrick and Nicklas, 2005). Parents can exert influence is many ways. One way is the simple fact that if parents are overweighed or obese there is a risk that children will follow the same path (Padez *et al*, 2005). Another fact influencing children's food choices is the parent's own choice of the food for the home meals. Branen and Fletcher (1999) found that long-run habits are recalls for what children used to eat at home. Moreover, the children's learning experience about the food comes largely from the observation of other people's habits. Consequently, parent's food choice and its confection are of utmost important (Moreira *et al*., 2008).

Many times parental choice is poor because parents don't even perceive that their children are overweighed, being difficult for them to realize the implicated risks on their food's choices (Crawford *et al*., 2007; Stutts *et al*., 2011) . Children tend to choose food that is provided by the parents and available at home (Patrick and Nicklas, 2005).

Another important issue is the economic crisis and family's economic status. Foods that are considered healthier, like fruit and vegetables, are more expensive compared with the fatty and sugary items (Story *et al*., 2008), which suggests that families spend less in this kind of food and choose energetic products and high caloric nourishments. According to Rasmussen *et al*. (2006), children who come from a low economic status tend to eat less fruit and vegetables at home. An issue that may be linked to this is the parental education. The level of parental education is inversely related with healthy food choice and further obesity (Padez *et al*.,2005; Moreira and Padão, 2004). Being parents' food choices and parental education factors that have an impact on children's eating habits it is expected that when parents choose more healthy food, and have more education, children choose healthier food.

H_3: Children whose parents choose healthy food tend to choose healthy food

H_4: Children whose parents have higher educational levels tend to choose healthy food

Home meals: More and more children are eating outside home (Story and French, 2004). However, food prepared outside home tends to be poor in terms of healthy nutrition (Guthrie *et al.,* 2002). The menus served in restaurants tend to have high amounts of calories and fat, which in fact means a less healthy diet (Mancino *et al*, 2010). When children eat in restaurants they tend to choose fast food, especially in the absence of their parents (Stutts *et al*., 2011). Not surprisingly, eating outside home has

been demonstrated to be related with overweight and obesity (Mancino *et al*., 2010). Moreover, Rasmussen *et al*. (2006) found an inverse association with the consumption of fast food and the reduction of fruit and vegetables.

Nowadays, restaurants are making an effort to include nutrition information in their menus to boost the choice for healthier food (Mancino *et al*., 2010). An important factor to take into consideration is that people usually do not understand the information and end up choosing the least healthy food anyway (Burton *et al*., 2009).

Important to underline is also the fact that there are more and more fast food restaurants near schools which lead children to choose and prefer more this kind of sustenance (Davis and Carpenter, 2009). Therefore it is expected that children that often eat at home tend to choose healthy food.

H_5: Children that frequently eat more at home tend to choose more healthy food

Last, we want to identify what is the combined effect of all these factors on the choice of healthy food, in order to assess the effect size of all the associated factors. The objective is to analyze if the children's physical activity, the sedentary life style, the parents' choices of healthy food, the parents' level of education and the proportion of time eating at home are all independently associated with children's food choices and, if yes, what their contribution in the choosing process is.

3. Methodology

Ethical issues

All ethical guidelines were taken into consideration (Greig *et al*., 2007; UNICEF, 2002). An authorization to perform the study was sent to the Ministry of Education, followed by an authorization sent to schools, and finally an authorization to children's parents

(Greig *et al*., 2007; Unicef, 2002). The child had to consent the study as well (UNICEF, 2002). Furthermore, it was said that there were no right or wrong answers to motivate all the respondents to be as honest as possible. It was also referred that the information was kept confidential and all the privacy rights would be respected (UNICEF, 2002).

Sample

After evaluating the Piaget's theory of cognitive development (1969), this study included children from 10 to 14 years old, presenting the last ages of the concrete operational stage (children between 7 and 11 years old) when they are capable of starting to think and relate objects and words, and the first of the formal operational stage (children with more than 11 years old) when they are capable of more complex discerning, deduction and starting to think similarly to an adult. Children from both age groups are important to be included in this study as for food choices children have to start to think abstractly and get sophisticated understanding of the marketplace correlating objects, as well as it is also crucial to include children with more than 11 years old being capable of rational judgments.

Procedure

A quantitative research was undertaken, collecting data from a representative sample in order to generalize the findings to the population of interest (Malhotra, 2010). The chosen method was written questionnaires due to the possibility they have to reach a self-report of a high amount of respondents, and also because they are the method that presents relatively low bias (Podsakoff *et al*, 2003). The sample size is very important and much consideration has been given to this issue (MacCallum *et al*., 1999). Therefore 330 parents' authorizations were delivered in two Portuguese Public schools

in Ermesinde, Porto, one presenting middle-upper class students and the other middle-lower class. The children were from the 5th to 9th grades. Parents also answered another questionnaire as it was necessary to have their answers on two constructs related to parents, as described in the hypotheses.

Measures

The following measures were included in the structured children and parent's questionnaires.

We followed the same procedure used in Dias and Agante (2011), by creating a situation that consisted on the presentation of two cards, each with six images (three healthy and three non-healthy food items each). The first card items were banana, bread and yogurt as healthy and pudding, cookies and chips as non-healthy items; the second card presented milk, strawberries, and fruit salad (healthy), candies, hamburger and chocolate mousse (non-healthy). The visual presentation is easier for children to understand the questions (Sullivan and Birch, 1990). Children were asked to choose three food items from each card. Answers were coded as 0 if the item was not selected and 1 if it was. A new variable was created which corresponded to the sum of all selected healthy food items. The maximum **healthy food items choice** was 6. The same procedure was applied to the parents.

In order to assess the physical activity and sedentary behavior, the Youth Risk Behavior survey (YRBS) was used. It is one of the most used surveys to assess this construct (Felts *et al*., 1996; Lee *et al*., 2001) and it has been validated (Biddle *et al*., 2011). The used version was the *2009 North Dakota Youth Risk Behavior Survey*[5] (questions 75-80). The measures consist of six questions assessing the physical activity (questions 1 to

[5] http://www.dpi.state.nd.us/health/YRBS/2009/hs/2009NDH_Questionnaire.pdf

4) and sedentary behavior (questions 5 and 6). The order of two questions was changed in order to have the questions of physical activity together and the questions about sedentary behavior together as well. The first four questions related directly to physical activity and have eight response options coded from 0 to 7 (depending on the hours spent on the activity) and the last two, related directly to sedentary behavior, have seven response options coded from 0 to 6 (also in hours spent). We averaged the six items from the physical activity scale to compute the **overall level of physical activity**, with questions 5 and 6 being inverted because of reverse scoring, and transformed to items between 0 and 7, which resulted in a continuous variable ranging between 0 and 7. The variable **sedentary behavior** was computed by the average of questions 5 and 6 resulting in a continuous variable ranging from 0 to 6.

Due to the impossibility of finding a reliable instrument to assess the **frequency of meals at home** construct, a sort of "game" was created where the child had to draw lines to make a correspondence between the days of the week and the several possibilities of places (parents' house – food prepared at home; parents' house – bought food, prepared elsewhere; School's canteen; School's bar; restaurant and relative's house – for example grandparents' or uncles'). The correspondence Game was checked and validated by a psychologist[6]. We attributed the adequate percentage in each day of the week that the children ate in each place as it was possible to choose more than one place in each day. Then we summed all the days that children ate at home at lunch (being home the parents' home – food prepared at home; relatives' home) and divided by 7 obtaining the frequency of eating at home in the whole week at lunch. We performed the same procedure with respect to dinner and then we summed the lunch

[6] **Liliana Ribeiro**, experienced Psychologist in Educational Behavior, works at *Cruz Vermelha Portuguesa*

and the dinner and divided by 2, creating the variable **frequency of children's meals at home** in the whole week.

In the parents' questionnaire, a question regarding the parents' educational level was included. The question had 7 response options (no studies or incomplete primary school; 4th grade; 6th grade; 9th grade; high-school; graduate degree; post-graduate degree). The **parents' educational level** variable was created by choosing the highest value between both parents, resulting in a categorical variable.

A question to assess the parents' interest on some nutrients (functional foods) was included. The question was constructed by presenting two images, one with the information that is presented on Cereals Fitness Nestlé (the one presenting the functional foods) and another with the information presented on the same cereals of a private brand. On the first figure's label, the following was written: Antioxidants, Vitamin E and Selenium, Iron and Calcium, Integral cereals. The second's figure label has the following: Low fat, Fiber's Source. The objective of the question was to understand which one they would prefer and this answer had the purpose of assessing the importance parents give to these nutrients.

3. Results

Sample Composition

Out of the 330 authorizations and questionnaires sent to parents, we obtained 172 accurate responses, representing a response rate of 52%. The collected data were entered and analyzed with SPSS Statistics version 17.0. Respondents were equally distributed per age (14.5% with 10 years old, 30.2% with 11 years old, 18.6% with 12 years old, 17.4% with 13 years old and 19.2% with 14 years old) and gender (46.5%

boys, 53.5% girls). 17.4% of the parents had a graduate degree, 27,3% had the high school completed, 25% had the 9th grade completed, 21.5% the 6th grade completed, 7% the primary school completed and 1,7% had no studies.

Descriptive Analysis

The descriptive statistics for the variables used to test the hypothesis are presented in table 1. Children had an average level of physical activity of 3.64 and an average sedentary behavior of 2.44. Regarding the children's and parent's healthy food choices, we can see that the choice for healthy food exceeded the choice of unhealthy food with an average of 4.26 (children) and 4.47 (parents). Children had 79% of the meals at home.

Table 1 – Descriptive statistics of physical activity, sedentary behavior, children's and parents' healthy food choices and frequency of meals at home

	Mean	Standard Deviation	Minimum	Maximum
Physical activity (0-7)	3.64	0.95	0.67	6.11
Sedentary behavior (0-6)	2.44	1.3	0	6.5
Children's healthy food choices (0-6)	4.26	1.48	0	6
Parents' healthy food choices (0-6)	4.47	0.8	2	6
Proportion of time of children's meals at home (0-1)	0.79	0.17	0.36	1

Regarding the question about functional foods, 76.7% of parents chose the figure presenting the functional nutrients.

Hypothesis Testing

The summary of the hypothesis testing is presented on table 2:

Table 2 – Hypotheses testing

Hypothesis	Independent Variable	Dependent Variable	Test	Results		Decision
				Spearman Correlation	Pearson Correlation	
H1	Physical activity	Children's healthy food choices	Correlation	p-value= 0.09 Spearman Correlation coefficient=0.13	p-value=0.07 Pearson Correlation coefficient =0.14	**Reject H1**
H2	Sedentary behavior	Children's healthy food choices	Correlation	p-value=0.00* Spearman Correlation coefficient = - 0.31	p-value=0.00* Pearson Correlation coefficient = - 0.34	**Do not reject H2**
H3	Parents' Healthy food choices	Children's healthy food choices	Correlation	p-value=0.01* Spearman Correlation coefficient = 0.25	p-value =0.01* Pearson Correlation coefficient = 0.24	**Do not reject H3**
H4	Parents' educational level	Children's healthy food choices	Chi-square	p-value=0.69		**Reject H4**
H5	Children's meals at home	Children's healthy food choices	Correlation	p-value=0.54 Spearman correlation= - 0.47	p-value=0.83 Pearson Correlation=0.02	**Reject H5**

***Significant association, p-value <0.05**

Hypothesis 1: This hypothesis related the children's physical activity with their healthy food choices. The hypothesis predicted that children with high levels of physical activity would tend to choose more healthy food. Since the variable reflecting the children's healthy food choices presented a deviation from normality, the results were confirmed through means of a non-parametric correlation. Spearman correlation coefficient was 0.13 (p-value=0.09 > 0.05). **There was a weak and non-significant correlation between the variables and, therefore, H1 is rejected**.

Hypothesis 2: This hypothesis relates the Children's sedentary behavior, measured by the frequency of watching TV and playing computer games, with their choices of healthy food. The two continuous variables were also correlated through a Spearman Correlation. A weak negative, but **significant**, correlation was found between the variables, ρ=-0.31, p-value=0.00 <0.05, which lead us **to not reject H2**.

Hypothesis 3: This hypothesis relates the parent's healthy food choices with children's healthy food choices. These two continuous variables were correlated through a

Spearman correlation (taking into consideration the deviation from normality of both variables). A **significant correlation** was found (p-value=0.01 < 0.05), being this association relatively **weak** (ρ=0.251). **Therefore, H3 is not rejected**.

Hypothesis 4: This hypothesis relates the parent's educational levels with their children's healthy food choices. Due to the parents educational levels being a categorical variable, a chi-square test on the association of both variables was undertaken and **showed that the variables are independent** (p-value of 0.69 > 0.05). **Therefore, H4 is rejected**.

Hypothesis 5: This hypothesis relates the frequency that children eat at home and their healthy food choices. The hypothesis predicted that children's who frequently eat at home would tend to choose healthy food. After performing a correlation test for both variables we obtained a spearman's correlation coefficient of ρ= -0.47 (p-value=0.54 > 0.05) showing that there was statistical evidence to reject the hypothesis. Therefore, **H5 is rejected**.

Furthermore, we wanted to identify, from all the factors hypothetically associated with the children's healthy food choices, which actually had an association. We first performed an **univariable linear regression** analysis, from which the only significantly associated variables were the **children's sedentary behavior** and the **parents' healthy food choices**. These two significant variables were included in a **multivariable linear regression model** and both of them remained significant (Table 3). The regression coefficient for the children's sedentary life was -0.327, which means that for each point of increase in the sedentary behavior scale (from 0 to 6), the children's choice of healthy food decreased 0.327 times. The regression coefficient for the parents' healthy food choices was 0.301, which means that for each healthy food item the parents choose (on

a 0-6 scale), the children's choice of healthy food would increase by 0.301. These are the only two factors that are independently associated with the children's choices of healthy food, also reinforcing the above hypotheses tests.

Table 3 – Factors associated with the children's healthy food choices

	Univariable linear regression	Multivariable linear regression
Children's sedentary life (0-6)	-0.373 (p-value=0.000)*	-0.327(p-value=0.000)*
Parent's healthy food choices (0-6)	0.430(p-value=0.001)*	0.301(p-value=0.023)*

***Significant association, p-value <0.05**

4. Discussion of Results

In summary, both the parents and the children chose a significant number of healthy food items comparing to the non-healthy. Three hypotheses were rejected, as opposed to what we expected. Confirming hypothesis 2 and 3 and rejecting hypothesis 1, 4 and 5 we found that children's choices were directly associated with the parents' choices and inversely associated with the level of the children's sedentary life style, but no association was found with the children's physical activity level, the parents' educational level or the home meals frequency.

First, the fact that a significant number of healthy food items was selected both by children and parents suggests that people nowadays are, to a certain extent, concerned about their eating habits. The fact that the main choices fell into healthy items creates a good opportunity for enterprises to develop educational programs, informing about the importance of eating healthy and reinforcing their interest in children. A child with a decent understanding of good nutrition will transmit that to parents who in turn will purchase and consume healthy food.

Contrary to our expectations in hypothesis 1, the high level of physical activity did not have a direct influence on the children choices for healthy food. This can be explained

through the fact that there are many factors involved in the choice, not being the physical activity alone an indicator. Among other factors already referred in this study, children tend to choose according to their tastes, the advertising and programs on TV or the need to go according to what their peers think.

Our second hypothesis was confirmed, meaning that an inverse association between a sedentary life style and the choice of healthy food was established, being the inverse also valid, the higher the sedentary life style, the higher the number of unhealthy food items chosen. Actually, children spend a great amount of their time watching TV or playing computer games, which usually leads to a demand for energetic food with high amounts of fat and sugar. An important factor might be the non-perception of the amount of time spent eating while watching a TV program or playing computer games. Moreover, TV advertisements of non-healthy food can be an important influence to children's poor food choices, which shows, in some manner, that the way companies advertise non-healthy food is efficient. This can lead to a good opportunity for managers to communicate and persuade children to eat healthy food instead of non-healthy, using the same advertising methods. Nowadays, children spend a significant proportion of their time playing online games that are interactive and competitive, and create most of the times moments of stress, which can lead to seeking for something energetic. Despite having these potential explanations in mind and also the fact physical activity itself did not show an association with the healthy food choice, we might conclude that fighting against a sedentary life style will lead to healthier eating habits. Not being able to identify a clear link between the food choices and physical activity we cannot recommend a marketing communication using sports by itself because it may not have the wished effectiveness. Nevertheless, a suggestion to marketers would be to use a combination of an active lifestyle (as the opposite of a sedentary lifestyle) and healthy

food to promote both. A possible implementation would be through the execution of educational programs and marketing campaigns stating that children who eat healthier can have a better performance on doing sports. Further research on this topic can be accomplished, through the understanding of associations between specific kinds of sports and the choice of healthy food. This would give room for certain food companies to promote their products through this way, associating specific sports with their products. A different explanation for the result may be that parents do not worry enough about their children's eating habits, having in mind that they are active and spend a lot of energy doing exercise. The parent's role on this issue should be to guarantee that the nutrients and calories spent doing exercise would be compensated through the adequate and nutritive healthy food. Moreover, the parent's role is also to control the hours children spend watching TV or playing computer games.

The third hypothesis was confirmed as it was expected: parents' choices influence children's choices. This is the proof that although children at the studied ages seek independence (McKinley *et al*., 2005), parents continue to be an important influence to them and seen as an example to be followed. Although already taking place, food industry should bear in mind that in order to reach children there is a need to reach their parents first. Following the same direction to educate people, companies could reach the parents by showing them the healthy properties of the product and therefore by convincing them to choose the product and consequently, to expose the children to it, who in turn would then also end up choosing it. It is essential that companies integrate parents and children, and make them aware of the language, and approach them in an easy and simple way, without too much detail and technical aspects.

The hypothesis 4 relating the parents' educational level and children's food choices was rejected contrary to what some studies found. A good explanation for that could be the

fact that nowadays companies promoting healthy food are targeting everyone in general aspects making everyone aware of the importance of healthy food, independently of their level of education. Indeed, this is a good strategy to pursue, as confirmed in this study.

The last hypothesis was also rejected meaning that the frequency of children eating at home does not influence their healthy choices. Despite the fact that there is no impact of home meals on children's choices this result reinforces the importance of parents influence on them meaning that the family environment is determinant being the parents' role to provide the children healthy nutrition inside home and moreover making them aware of the meals preparation.

To our knowledge, this is the first study presenting the three factors associated with children's food choices, when studied together and assessing their independent effect. Indeed, a sedentary life style and parents' food choices independently contributed for the children's food choices and showed both to be important aspects to target when attempting to shape children's food choices.

5. Limitations and Future Research

Some limitations can be identified, which would need to be addressed in the future, and we also present some recommendations for future research.

Our research concerned a specific area of the country, and only in one region and future research on this issue may have to take into consideration the presence of other regions and other countries. A second limitation was the lack of questions to test the coherence of the answers or the social desirability bias of some answers. This would influence the duration of the questionnaire and that was the reason to not apply them. One example was the question on the parents' choice for healthy food, for which answers can be

biased, as they are parents and sometimes want to show good eating habits even if those are not the reality.

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